



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/502,423	09/08/2004	Gero Base	112740-987	8131
31625 7590 12/05/2008 BAKER BOTTS L.L.P. PATENT DEPARTMENT 98 SAN JACINTO BLVD., SUITE 1500 AUSTIN, TX 78701-4039				
EXAMINER				
YEH, EUENG NAN				
ART UNIT		PAPER NUMBER		
2624				
MAIL DATE		DELIVERY MODE		
12/05/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/502,423

Applicant(s)

BASE ET AL.

Examiner

EUENG-NAN YEH

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on September 26, 2008 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 31, 2008 has been entered.

Drawings

2. The amended drawings are objected to because of following minor informalities:
The figure 3 in the new sheet is objected to as failing to comply with 37 CFR 1.84(p)(5) because this newly added figure 3 does not include the reference steps 310, 320, and 330 mentioned in the amended description.

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 14-23 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent (*Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876)) and recent Federal Circuit decisions (*In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008)) indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claims recite a series of steps or acts to be performed, the claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore

do not qualify as a statutory process. In order for a process to be "tied" to another statutory category, the structure associated with another statutory category must be positively recited in a step or steps significant to the basic inventive concept, and NOT just in association with statements of intended use or purpose, insignificant pre or post solution activity, or implicitly. For example: the independent claim 14 performs coding macro blocks and limiting reference images and none of above processes positively "tied" to another statutory category.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of J. Kim et al. (US 2003/0031128 A1; hereinafter referred to as Kim03) and H. Kim et al. (US 2002/0126757 A1; hereinafter referred to as Kim02).

Regarding claim 14, Kim03 discloses a coding system comprising:
coding a number of macro blocks of the images by a first intra-coding mode depending on a predetermined criteria ("Many standard MPEG-4 encoders can only handle one scene, that is, one I-frame followed by P-frames or B-frames, or they introduce regular I-frames every k frames, as is commonly done in MPEG-2 encoding ..." in paragraph 47,

line 1. Furthermore, "[I]n one embodiment, the encoder module 106B (*figure 1B*) then performs adaptive motion change detection to efficiently reduce large propagation errors. In particular, adaptive intra refresh (AIR) is used to reduce error propagation in an MPEG data stream by the selective intra-coding of macroblocks in p-frames. Thus, AIR is used to help determine how many macroblocks should be intra-encoded in the detected motion region of a frame ... Thus, preferably, bandwidth and the bit error probability (BER) are taken into account to determine the percentage or number of macroblocks that are to be intracoded" in paragraph 177, line 1);

coding a number of macro blocks of the images by a second intra-coding mode ("In one embodiment, Cyclic Intra Refresh (CIR) and Adaptive Intra Refresh (AIR) are performed as follows. The number of Intra macroblocks in a VOP is specified by the user in the encoder parameter file. The number of Intra macroblocks in a VOP depends on target bit rate, frame rate, bit buffer usage, channel noise feedback, and other transmission related parameters. The encoder module 106B estimates the amount of motion for each macroblock and selects heavy motion area to be encoded in INTRA mode to enhance error resiliency" in paragraph 179, line 1);

limiting the set of accessible reference images in such a way that referencing takes place from image areas that were not subject to the first intra-coding mode in a temporal subsequent image ("... [a]n intercode distortion value and an intracode distortion value are calculated, as are an intercode bit quantity and an intracode quantity. Based on a comparison of the calculated intercode distortion value and the intracode distortion value, and on a comparison of the intercode bit quantity and the intracode bit quantity

for each macroblock, a decision is made as to which predicted frame macroblocks are to be intracoded" in paragraph 16, line 8. As discussed before that I-frames are preferably used in scene-changes only and the scene change analysis is based on RMS calculation and MAD calculation discussed in paragraphs 50-54. "in one example a frame is designated as a scene change, and thus will be coded in INTRA mode, when its MAD is greater than 20 and the second derivative of RMS is negative and has an absolute value of greater than 4. In another example, a frame is designated as a scene change, and thus will be coded in INTRA mode, when its RMS is greater than 40 ..." in paragraph 59, line 1. As the reference images are used by the predicted frame, the P-frame, in a temporal subsequent image wherein "enhanced Adaptive Intra Refresh (AIR) process provides efficient error resiliency by selectively and adaptively encoding macroblocks in a predicted frame" in paragraph 16, line 1, and "error resiliency technique adopted by MPEG-4 is data partitioning, used to separate motion information from texture information using a second resynchronization marker inserted between motion and texture information. Thus, if there is an error and the texture information is undecodable or lost, the decoder can utilize the motion information to conceal the error by using the motion information to compensate the previous decoded frame or VOP" in paragraph 12, line 6. Thus, areas subject to first intra-coding mode which caused by some erring conditions will not be used to avoid error propagation).

Kim03 discloses the motion vectors for the inter-coding mode condition as shown in figure 8B for the dashed lines such as 804B to 818B. Kim03 does not explicitly disclose a coding system to perform the intra/inter block selection.

Kim02, in the same field of endeavor of video encoding ("intra updating technique based on error probabilities estimated from a size of bit stream for each block" in paragraph 1, line 3), discussed in figure 2, numerals 209 and 210 for inter/intra coding process: "[w]hen carrying out an encoding as a measure for the case where errors occur during the transmission, and where thus the normal decoding becomes impossible, the relevant blocks are not subjected to the inter coded frame encoding method, but to the intra coded frame encoding method" in Kim02 paragraph 20, line 5.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to provide the coding system Kim03 made with intra/inter block coding selection as taught by Kim02, "thus, the degradation of the picture quality due to the error propagation can be overcome ..." in Kim02 paragraph 39, line 10.

Regarding claim 15, the predetermined criteria for carrying out the coding in a first intra-coding mode are error robustness criteria with respect to an incorrect transmission of coded images (discussed in claim 14, "MPEG-4 provides for object scalability, improved error robustness and enhanced compression" in Kim03 paragraph 9, line 6).

Regarding claims 16 and 17 (the first intra-coding mode under error robustness condition was carried out by MPEG-4: "MPEG-4 has enhanced error resiliency as compared to previous versions of MPEG so that video data can be more successfully transmitted over such error prone networks ..." in Kim03 paragraph 11, line 1. This can

be carried out at regular time intervals: "standard MPEG-4 encoders can only handle one scene, that is, one I-frame followed by P-frames or B-frames, or they introduce regular I-frames every k frames ..." in Kim03 paragraph 47, line 1. Or, at random time intervals: "To adequately improve the coding efficiency, the number of I-frames should be reduced or minimized. In the absence of error conditions, I-frames are preferably used in scene-changes only ..." in Kim03 paragraph 47, line 7).

8. Claims 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kim03 and Kim02 as described above, and further in view of Yokoyama et al. (US 6,078,618).

Regarding claim 18, the combination of Kim03 and Kim02 teaches a coding system comprising:

determining a rate distortion movement compensation value for each of the motion vectors ("... [b]ased on a comparison of the calculated intercode distortion value and the intracode distortion value, and on a comparison of the intercode bit quantity and the intracode bit quantity for each macroblock, a decision is made as to which predicted frame macroblocks are to be intracoded" in Kim03 paragraph 16, line 10. Without departing from the scope and spirit of Kim03's methodology, the amount of distortion value and bit quantity is the rate distortion movement compensation value);

selecting motion vectors in accordance with a determined rate distortion movement compensation value (as discussed above, the rate distortion movement compensation value will be used to determine macroblocks which defines the motion vectors).

The Kim03 and Kim02 combination does not explicitly disclose the moving vector optimization.

Yokoyama, in the same field of endeavor of video encoding ("relates to a motion vector estimation system which is used for encoding a moving picture" at column 1, line 4), illustrates the motion vector estimation system in figure 1, numeral 103: "the invention is to provide the motion vector estimation system and method capable of estimating the optimum motion vector even in the case where a limited search window is used" at column 3, line 5.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to provide the coding system of Kim03 and Kim02 combination, to include moving vector optimization as taught by Yokoyama, "...to improve the picture quality measured by the S-N ratio ... to estimate the optimum motion vector, thereby obtaining an improved effect of the picture quality ..." at column 10, line 32.

Regarding claim 19, the step of limiting the set of accessible reference images further comprises the step of creating a limited number of inter-coding mode combinations and reference images, wherein combinations that were coded in a later image in a first intra-coding mode are removed (as depicted in Kim02 figure 2, numerals 206 and 213 to create a limited number of inter-coding and reference image).

Regarding claim 20, the step of limiting the set of accessible reference images further comprises the step of forming a best combination based on the rate distortion

(discussed in claim 18 the moving vector is optimized, thus, the distortion rate optimally comprises the best combination. Furthermore, "A certain number of bits are needed for the Inter mode encoding and the Intra mode encoding ... can be used to select the best coding mode" in Kim03 paragraph 228, line 1. See also Kim02 figure 2, numeral 212 the threshold control for the frame and bit determination).

Regarding claim 21, the rate distortion is determined by processing an error rate to be expected when the coded images are transmitted ("If the encoder has sufficient resources and capability, a full Rate-Distortion optimization can be performed that involves determination of an optimal weighting factor λ to be used for evaluating a cost function for each macroblock, given by:

$$C = D + \lambda R$$

Equation 24"

in Kim03 paragraph 229, line 1. Wherein D is the rate and R is the distortion).

Regarding claim 22, the distortion of the pixel values contains the total of the quadratic differences between the pixel values before coding and the correspondingly decoded pixel values ("in one embodiment the encoder system 100 includes corresponding decoder circuitry so that it can mimic the decoder process and reconstruct what the decoder will reconstruct both in the absence of errors, and in the presence of one or more errors, such as a single error affecting just the current macroblock ("MBC"). By way of example, the difference between the error-free

reconstruction and the reconstruction assuming one error is termed "concealment error" or EC. EC is defined as follows:

$$EC = MBQ - MBC \quad \text{Equation 16}$$

Where MBQ is the error free reconstruction, and MBC is a single error reconstruction" in Kim03 paragraph 198, line 2. Furthermore, variance, i.e. quadratic difference, is being introduced in Kim03 paragraphs 208 and 209).

Regarding claim 23, the distortion is estimated to determine the rate distortion criteria (discussed in claim 21 Equation 21, the distortion D is estimated to determine the cost function C, i.e. the rate distortion).

Response to Arguments

a) Summary of Applicant's Remark:

The previous drawing, specification and claim objections should be withdrawn in view of the amendment.

Examiner's Response:

The amendments overcome the figures 1 and 2, specification and claim objections. However, the newly added figure 3 is objected. Refer to the discussions above.

b) Summary of Applicant's Remarks:

"Applicants amended independent claim 14 to include the limitation "coding a different number of macro blocks of the images by a second intra-coding mode or by an inter- coding mode, wherein motion vectors for the macro blocks that are coded in the inter-coding mode are selected from a set of accessible reference images." This limitation is disclosed in the originally submitted specification, for example, on page 4, lines 19. Thus, no new matter has been introduced" at response page 10, bottom paragraph.

"Neither KIM nor KIM02 disclose this limitation. Hence, Applicants believe that the independent claim 14 is patentable with respect to the cited references" at response page 11, first paragraph.

Examiner's Response:

It is the combination of KIM and KIM02 teaches the claimed subject matter. As KIM figure 8B shows the motion vectors for inter-coding macro blocks and KIM02 figure 2 shows the intra/inter selection. Refer to the rejections above.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eueng-nan Yeh whose telephone number is 571-270-1586. The examiner can normally be reached on Monday-Friday 8AM-4:30PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Eueng-nan Yeh
Assistant Patent Examiner
Art Unit: 2624
/E.Y./

/Vikkram Bali/
Supervisory Patent Examiner, Art Unit 2624